

Serial No. 09/961,147

IN THE CLAIMS

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please **AMEND** the claims according to the following:

1. (CURRENTLY AMENDED) An information processing apparatus for displaying an information object in a virtual space according to visual field data, where the information object represents one or more respective linked content items of different content types, and where said visual field data defines a visual field in said virtual space, said apparatus comprising:

holding means for holding, in an executable manner, a plurality of intermediate data generating means specific to said respective linked content items of different content types of the information object for generating respective pieces of intermediate data specific to a content type of a particular linked content item of the information object, said generated piece of intermediate data comprising at least either of texture data ~~and/or~~ display form defining data, and for holding, in an executable manner, a plurality of different display image generating means specific to said respective linked content items of different content types of the information object for generating respective display images from said respective generated pieces of intermediate data;

first means for causing said plurality of intermediate data generating means to generate the respective pieces of intermediate data for displaying a particular linked content item of the information object, ~~when determined according to a geometric relation between said visual field and said information object to generate said respective pieces of intermediate data of said~~ particular linked content item of the information object;

a memory for storing the generated pieces of intermediate data for rendering a display image; and

second means for causing said plurality of different display image generating means to generate display images of said particular linked content item of the information object from said respective generated pieces of intermediate data, to render the display image on a display

Serial No. 09/961,147

memory region, ~~when determined according to the geometric relation between said visual field and said particular information object to display said particular linked content item of the information object.~~

2. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 wherein each intermediate data generating means and each display image generating means operate asynchronously with each other for a respective content type of a particular linked content item of the information object.

3. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 wherein each intermediate data generating means operates under control of said first means, to generate and renew a piece of intermediate data for displaying a particular linked content item of the information object, and each display image generating means operates simultaneously with each respective intermediate data generating means for the particular linked content item of the information object, under control of said second means, to generate a display image of the particular linked content item of the information object from said generated and renewed piece of intermediate data.

4. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 wherein said holding means holds a plurality of information object content type specific data processing means, each information object content type specific data processing means including at least intermediate data generating means for generating a piece of intermediate data of a particular content type of a particular linked content item of an information object and display image generating means for generating a display image from the piece of intermediate data of the particular content type of the particular linked content item of the information object.

5. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 wherein said holding means holds in an executable manner a plurality of different data processing means specific to said linked content items of different content types of the information object, each data processing means including corresponding one of said intermediate data generating means for generating a piece of intermediate data for a content type of a particular linked content item of the information object, corresponding one of said display image generating means, corresponding content data capturing means specific to said

Serial No. 09/961,147

content type of the particular linked content item of the information object for capturing content data of said particular content type of the linked content item of the information object, and corresponding intermediate data deleting means specific to said content type of the particular linked content item of the information object for deleting said generated piece of intermediate data in said memory.

6. (PREVIOUSLY PRESENTED) The information processing apparatus according to claim 1 wherein each intermediate data generating means is implemented as program codes, and each display image generating means is implemented as program codes; and

said apparatus further comprises data capturing means for capturing said intermediate data generating program codes and said display image generating program codes into said holding means from an external device or a communication line.

7. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 further comprising:

visual field data managing means for smoothly changing said visual field data according to an input command; and

display means for displaying the generated display images of said particular linked content item of the information object.

8. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 further comprising:

means for assigning a display priority to each of a plurality of linked content items of an information objects~~object~~;

said first means comparing said display priority of a particular linked content item of an information object with a predetermined threshold to thereby determine whether to generate a piece of intermediate data of said particular linked content item of the information object;

said second means comparing said display priority of said particular linked content item of the information object with a predetermined threshold to thereby determine whether to generate a display image of said particular linked content item of the information object.

9. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 wherein:

Serial No. 09/961,147

said holding means further holds a plurality of different intermediate data deleting means specific to said respective different content types of linked content items of the information object for deleting said respective generated pieces of intermediate data;

said information processing apparatus further comprises managing data for a plurality of ~~the~~linked content items of an information objects~~object~~, and means for assigning display priorities to respective ones of said plurality of linked content items of the information ~~objects~~object;

said first means comparing said display priority of a particular linked content item of an information object with a predetermined threshold to thereby determine whether to generate or renew a piece of intermediate data of said particular linked content item of the information object;

said first means causing corresponding one of said intermediate data generating means to generate or renew said piece of intermediate data of said particular linked content item of the information object when the display priority of said particular linked content item of the information object is higher than the predetermined threshold;

said first means causing corresponding one of said data deleting means to delete said piece of intermediate data of said particular linked content item of the information object in said memory when the display priority of said particular linked content item of the information object is lower than a predetermined threshold;

said first means deleting managing data of said particular linked content item of the information object in said memory when the display priority of said particular linked content item of information object is lower than a predetermined threshold.

10. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 wherein each display image generating means determines a form in which a generated display image is displayed, according to the geometric relation between said visual field and a particular linked content item of an information object.

11. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 wherein display priorities are assigned to respective ones of a plurality of linked content items of an information ~~objects~~object, and when a display image of a particular linked content item of the information object is to be displayed, a corresponding one the display image generating means determines a form in which said display image of said particular linked

Serial No. 09/961,147

content item of the information object is to be displayed according to a display priority of said particular linked content item of the information object.

12. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 further comprising:

a memory region of said memory for storing therein display data including the pieces of intermediate data for displaying said a plurality of linked content items of an information objectsobject; and

memory managing means for detecting an amount of said memory region occupied by said display data and time-sequentially deleting from said memory region at least part of the pieces of intermediate data not used for display image generation for a longest time.

13. (CURRENTLY AMENDED) The information processing apparatus according to claim 1 further comprising:

third means for selecting one of said a plurality of linked content items of an information objectsobject as a representative objectlinked content item of the information object and defining said visual field by defining a geometric relation of said representative objectlinked content item to said visual field;

said third means altering said representative objectlinked content item, without changing the geometric relations of said plurality of linked content items of the information objectsobject to said visual field, as said visual field shifts in said virtual space;

said first means traversing linkages between said plurality of linked content items of the information objectsobject, starting with said representative objectlinked content item, to thereby determine whether to generate a piece of intermediate data of a particular linked content item of the information object.

14. (CURRENTLY AMENDED) The information processing apparatus according to claim 13 wherein display priorities are assigned to respective ones of the plurality of the linked content items of the information objectsobject, and said third means selects one of said plurality of linked content items of the information objectsobject having a highest display priority as said representative objectlinked content item.

15. (CURRENTLY AMENDED) A computer readable data storage storing at least

Serial No. 09/961,147

one program controlling a computing apparatus for displaying an information object in a virtual space according to visual field data, where the information object represents one or more respective linked content items of different content types, and where said visual field data defines a visual field in said virtual space, according to a process comprising:

storing, in an executable manner, a plurality of programs specific to said respective linked content items of different content types of the information object, each information object linked content item type specific program generating intermediate data specific to a content type of a linked content item of a particular information object, wherein said generated intermediate data comprises at least either of texture data ~~and/or~~ display form defining data, and each said program generating a display image specific to said linked content item type of the particular information object from said generated intermediate data;

causing the intermediate data to be generated for displaying said particular linked content item of the information object, according to a geometric relation between said visual field and said linked content item of the information object;

a memory for storing the generated intermediate data for rendering a display image; and causing said particular linked content item of the information object to be generated/displayed from said generated intermediate data, according to the geometric relation between said visual field and said linked content item of the information object, to render the display image on a display memory region.

16. (PREVIOUSLY PRESENTED) The computer readable storage according to claim 15, wherein the process further comprises asynchronously performing the causing the intermediate data to be generated with the causing the display image to be generated.

17. (PREVIOUSLY PRESENTED) The computer readable storage according to claim 15, wherein the process further comprises performing the causing the intermediate data to be generated or renewed simultaneously with the causing the display image to be generated.

18. (CURRENTLY AMENDED) The computer readable storage according to claim 15 wherein said storing comprises storing, in an executable manner, at least one information object linked content item type specific processing program, said at least one information object linked content item type specific processing program ~~performing the~~ generating the intermediate data of the particular content type of the linked content item of the information object, and generating

Serial No. 09/961,147

a display image of the particular content type of the linked content item of the information object.

19. (CURRENTLY AMENDED) The computer readable storage according to claim 15 wherein each information object linked content item type specific program captures information object linked content data of corresponding linked content item type, and deletes intermediate data of said corresponding linked content item type in the memory.

20. (CURRENTLY AMENDED) The computer readable storage according to claim 15 wherein the process further comprises:

assigning display priorities to respective ones of a plurality of linked content items of an information objectsobject;

comparing said display priority of said particular linked content item of the information object with a predetermined threshold to determine whether to generate the intermediate data of said particular linked content item of the information object; and

comparing said display priority of said particular linked content item of the information object with a predetermined threshold to determine whether to generate the display image of said particular linked content item of the information object.

21. (CURRENTLY AMENDED) The computer readable storage according to claim 15 wherein each information object linked content item type specific program deletes said generated intermediate data from said memory; and

said process further comprises:

assigning display priorities to respective ones of a plurality of linked content items of an information objectsobject;

comparing said display priority of said particular linked content item information object with a predetermined threshold to determine whether to generate or renew said intermediate data of said particular linked content item information object;

causing said intermediate data of said particular linked content item of the information object to be generated or renewed, when the display priority of said particular linked content item of the information object is higher than the predetermined threshold;

causing said intermediate data of said particular linked content item of the information object in said memory to be deleted, when the display priority of said particular linked content item of the information object is lower than a predetermined threshold.

Serial No. 09/961,147

22. (CURRENTLY AMENDED) The computer readable storage according to claim 15 wherein the process further comprises assigning display priorities to respective ones of a plurality of linked content items of an information object; the generating of the display image comprising, when the display image of said particular linked content item of the information object is to be displayed, determining a form in which said display image of said particular linked content item of the information object is displayed according to the display priority of said particular linked content item of the information object.

23. (CURRENTLY AMENDED) The computer readable storage according to claim 15 wherein the intermediate data generating comprises storing data for display including generated intermediate data for displaying ~~said~~ a plurality of linked content items of an information object in said memory, and the process further comprises:

detecting an amount of said memory occupied by said display data; and
sequentially deleting in said memory at least part of the generated intermediate data not used for display image generation for a longest time.

24. (CURRENTLY AMENDED) The computer readable storage according to claim 15 wherein the process further comprises selecting one of a plurality of linked content items of an information object as a representative linked content item of the information object and defining said visual field by defining a geometric relation of said representative ~~object~~linked content item to said visual field, the selecting ~~comprising~~comprises altering said representative ~~object~~linked content item without changing the geometric relations of said plurality of linked content items of the information object to said visual field, as said visual field shifts in said virtual space,

wherein said process further comprises traversing linkages between said plurality of linked content items of the information object, starting with said representative ~~object~~linked content item, to cause intermediate data of one of the plurality of linked content items of the information object to be generated.

25. (CURRENTLY AMENDED) A method of displaying, in a computing apparatus, an information object in a virtual space according to visual field data, where the information object represents one or more respective linked content items of different content types, and where

Serial No. 09/961,147

said visual field data defines a visual field in said virtual space, said method comprising:

processing data, specific to said respective linked content items of different content types, of the information object, by generating a piece of intermediate data specific to a content type of a particular linked content item of the information object, wherein said generated piece of intermediate data comprises at least either of texture data ~~and/or~~ display form defining data, and by generating a display image specific to said particular linked content item of the information object from said generated intermediate data;

causing the piece of intermediate data to be generated for displaying said particular linked content item of the information object ~~to be displayed~~, according to a geometric relation between said visual field and said particular linked content item of the information object;

storing, in a memory, the generated piece of intermediate data for rendering a display image; and

causing said particular linked content item of the information object to be ~~generated~~displayed from said generated intermediate data, according to the geometric relation between said visual field and said particular linked content item of the information object, to render the display image on the display memory region.

26. (CURRENTLY AMENDED) A computing apparatus that displays an information object in a virtual space according to visual field data, where the information object represents one or more linked content items of different types, and where the visual field data defines a visual field in the virtual space, the apparatus comprising:

a data storage that stores, in an executable manner, a plurality of intermediate data generators, each corresponding to a different linked content item type of an information object to generate display intermediate data of the linked content items of different types of the information object, said generated intermediate data comprising at least either of texture data ~~and/or~~ display form defining data, and stores a plurality of display image generators, each corresponding to the linked different content item types of the information object to generate display images from corresponding generated display intermediate data of the linked content item types of the information object;

an information object data manager ~~causing to cause~~ one of the intermediate data generators corresponding to a linked content item type of the information object to generate display intermediate data to display a representative linked content item ~~of a type~~ of the information object, according to a geometric relation between the visual field and representative

Serial No. 09/961,147

linked content item of the information object;

a memory ~~for storing~~ to store the generated intermediate data to render a display image on a display memory region; and

an image generator ~~causing to cause~~ one of the display image generators corresponding to the linked content item type of the information object to generate a display image of the linked content item type of the information object from the generated display intermediate data of the linked content item type of the information object, according to the geometric relation between the visual field and the linked content item of the information object, to render the display image on the display memory region.